Systems Integration and Outsourcing in the U.S.

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January 25, 1994

NEC
Systems Integration Management School

Presented by:
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Vice President

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Systems Integration and Outsourcing in the U.S.

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Agenda

SYSTEMS INTEGRATION AND OUTSOURCING IN THE U.S.

- Introduction
- SI and Outsourcing: Background and Definitions
  - Market Size and Trends
  - Customer Dependence and Vendor Control
  - Relation of SI and Outsourcing
- Client/server: Background and Definitions
  - Impact on SI and Outsourcing
  - "Winners" and "Losers": Technologies, Firms
  - Trends

(Cont.)

SYSTEM INTEGRATION AND OUTSOURCING IN THE U.S.

- SI Vendors
  - Overview
  - Capabilities Required
- Profiles of EDS, Andersen Consulting, IBM
  - Strategy
  - Organization
  - Functional and Technical Skills
  - Education and Training
- Strategies for Hardware Vendor Entry into SI

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Market Research and Consultancy

Information Services Industry

15 Years in Business

100 Employees

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MS-6

Notes

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California, New York, Washington D.C.,
London, Paris, Tokyo

Primary Research Emphasis

Senior Executives Experienced in
Information Services

Forecast from Comprehensive Data Base

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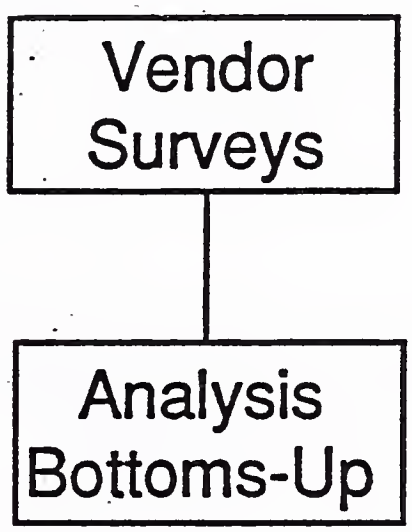
Notes

Research Methodology



- 500 largest
- Revenues: current/ prior years
- Growth rates
- Industries
- Delivery mode (7)
- Industry sector (22)

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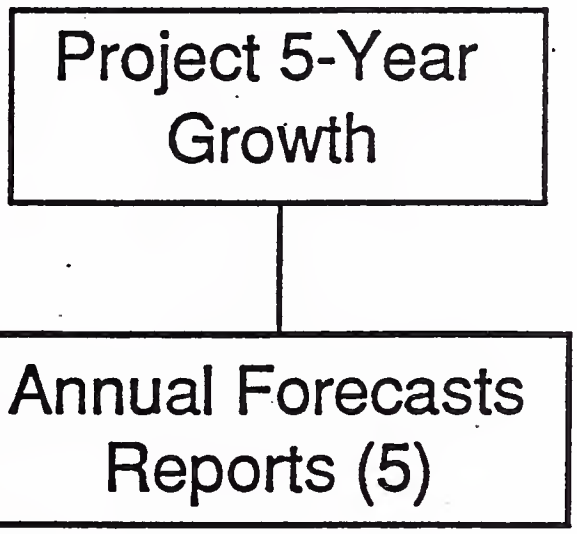
Notes

Research Methodology



- User surveys
- Technology
- Economics
- Vendor activity
- Industry trends
- Driving forces
- Inhibiting forces

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Notes

Representative Corporate Client List

ARC/Sequa
Ameritech
Acxiom
Advantis
ALLDATA GmbH
Amdahl
Andersen Consulting
ANSTEC
Apple Computer
AT&T
AT&T Istel
Auspex Systems
Automated Sciences Group
Bell Atlantic
Bellcore
Bellsouth
Beverly Enterprises
Boeing Computer Services
Booz, Allen and Hamilton
Borland International
Braxton Associates
British Telecom
Bull S.A.
Cabletron Systems
C3/Telos Systems
CACI
Cadre Technologies
CAI/SISCO
Candle
CAP Gemini America
Cedar Cliff Systems
Centre-file, Ltd.
Ceridian
CGI Group
Cincinnati Bell (CBIS)
CISCO Systems
Commission of European Communities
Compaq Computer
Comprehensive Technologies
Computer Applications Company, Ltd.
Computerland
Computer Sciences Corp.
Computer Sciences of Australia
Computervision
Comsis
Control Data Corp.
C&C International
CTA Inc.
Dataserv
Debis Systemhaus GmbH
Dell Computer
Delloitte Touche
DETECON
Digital Equipment Corp.
Eastern Computers
Eastman Kodak
EDS
Empirika GMBH
Ernst & Young
ESG Elektronik Systems
E-Systems
Executive Resource Associates
Federal Data Corp.
Finsiel Spa
First Data Corp.
France Telecom
Fujitsu Limited
General Electric Information Services
General Sciences Corp.
GENIX
Grumman Data Systems
GSI
GTE
GTSI
Harris Government Systems
Hewlett-Packard
HFSI
Hitachi
Hughes Aircraft
IBM Canada, Ltd.
IBM
IIT Research Institute
IMI Systems
Industry, Science & Technology
Information Systems & Network Corp.
Ingres/ASK
Inq. C. Olivetti & C. S.P.A.
Interleaf
International Computers Limited (ICL)
ITS
Japan Information Processing Center
KPMG Peat Marwick
Litton Computer Services
Logicon
Loral Aerosys
Mandex
Martin Marietta Data Systems
Maxima
MCI
McKinsey & Company
MCN Computer Services
Metaphase Technology
Microsoft
Mirecki Associates
Mitsubishi Electric Corp.
Moore Corp.
MPACT EDI Systems
National Computer Systems
National Systems and Research Co.
NCI Information Systems
NCR
NEC
Newbridge Networks
Nifty Corp.
Nippon Steel Corp.
Nippon Telegraph & Telephone
Nomura Research Institute
NORTEL Federal Systems
NMI
NTT America
Orkand
Pacific Telesis
Paramax Systems
Philips International BV
Power Computing
Presidio
Price Waterhouse
PRC
PSI International
Resource Consultants
RMS Technologies
Sema Group
Sequent Computer Systems
Serics Ministry of Industry
SHL Systemhouse
Siemens Nixdorf
Sligos
Software AG
Sogo Software Institute
Sony
Source One
Southwestern Bell
Stentor Resource Center
Sterling Software
Stratus Computer
SunGuard Data Systems
Sun Microsystems
Symmetrix
SYSCON
Systematics Information Services
Tektronix
Tele-Daten Service
Télésystemès S.A.
Telos Systems Group
Texas Instruments
3COM Corp.
Toshiba
TRW
TSC
TSI International
Unisys Corp.
University of California
US West
Vitro Corp.
Washington Data Service
Welsh, Carson, Anderson and Stowe
W.S. Thompson Associates

Учебник подготовлен ООО «Русское слово – учебник»

Special Studies Conducted on Systems Integration

- Executive research on relationship of SI and outsourcing software support

- Business process re-engineering practices and strategies of major providers

- Advising on reuse of SI skills developed in the Federal market for the commercial market (several studies)

Special Studies Conducted on Systems Integration (Cont.)

- Relationship of strategic consulting to SI
- Advised computer systems vendors on correct approaches to the SI market (several vendors)
- Performed targeted studies for leading SI firms on methods of expanding their business (many studies)

SI Definition

- Vendor-provided service
- Complete solution to complex requirement for:
  - Information systems
  - Networking
  - Automation

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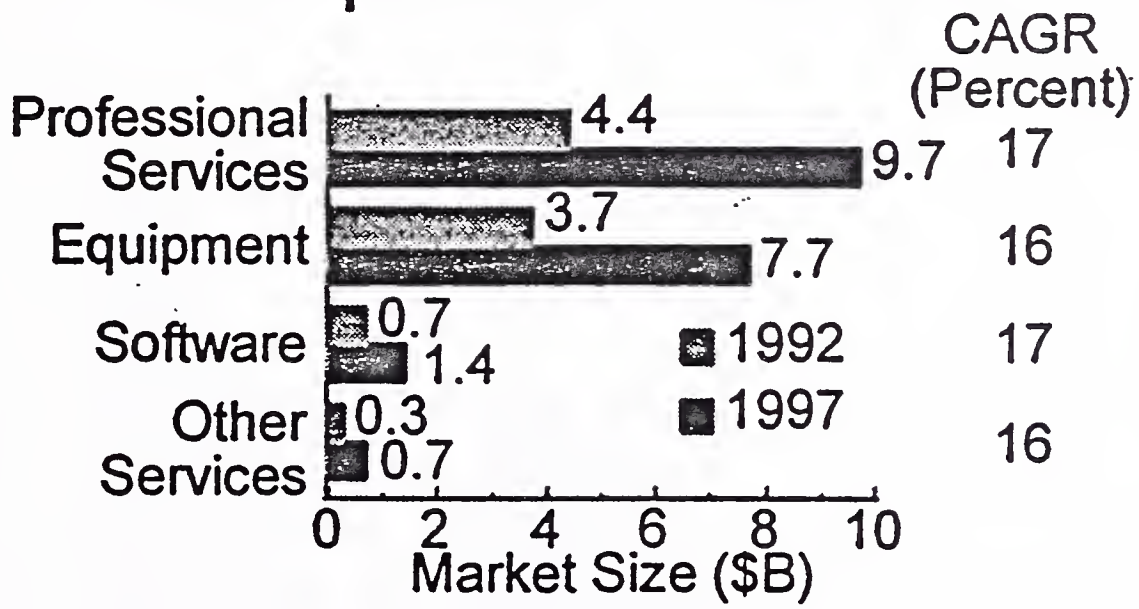
Systems Integration Market Component Forecast



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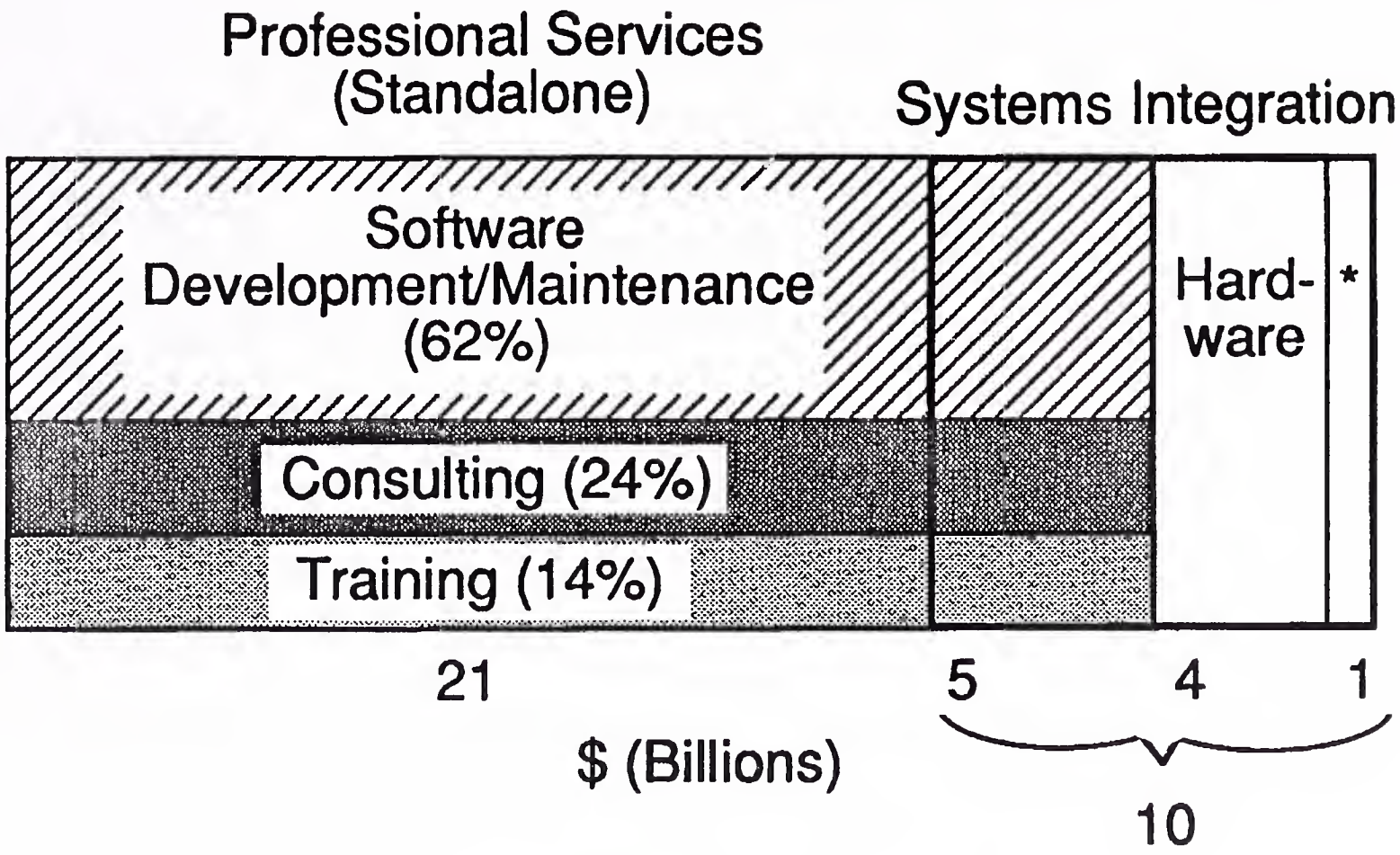
Professional Services & Systems Integration, 1993



* Software Products

Service Categories

Delivery Category	Addresses	Vendor Role
Professional Services (Standalone)	Tasks	Vendor supplies knowledgeable personnel
SI	Projects	Vendor is responsible for results

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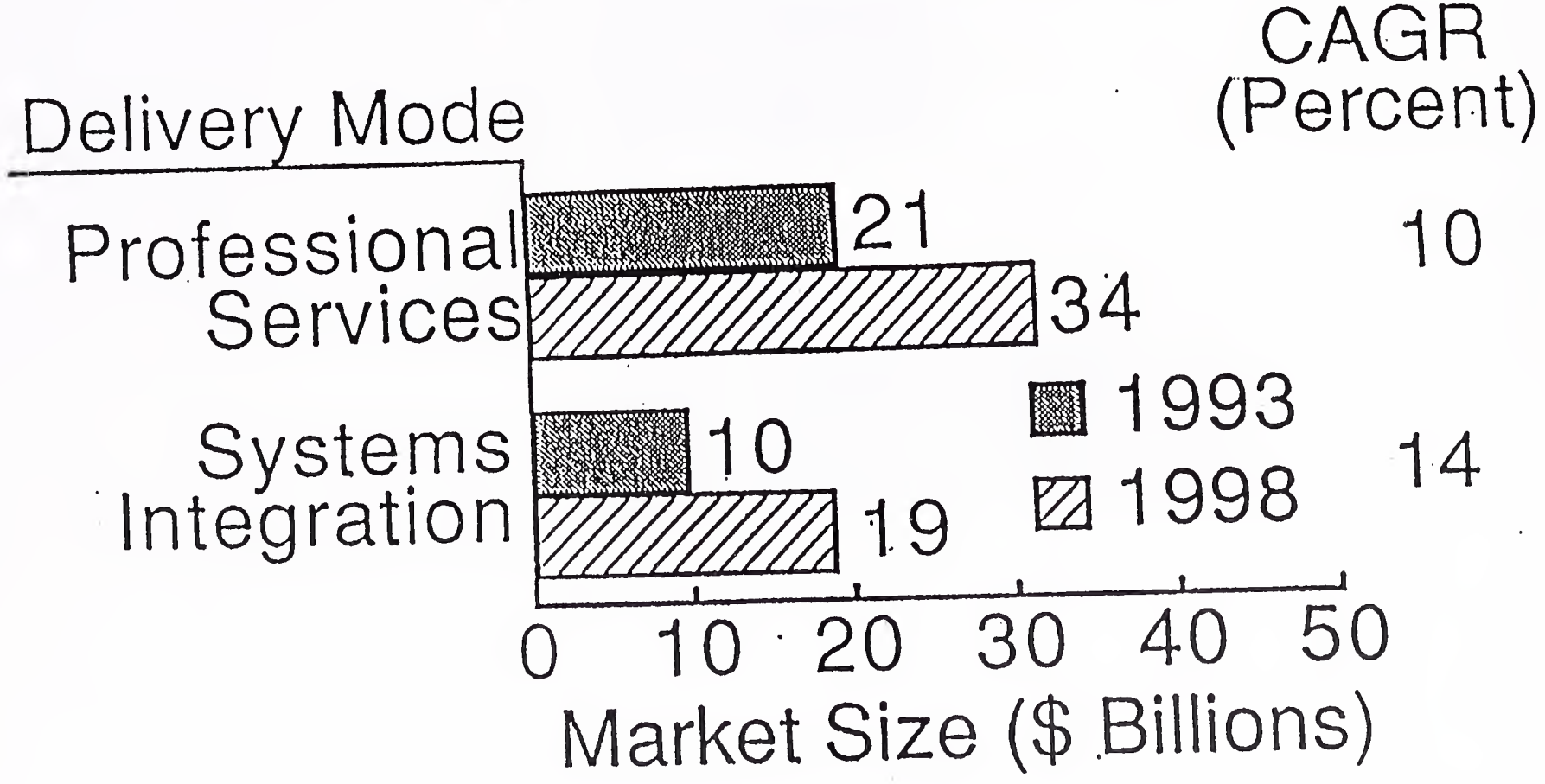
U.S. Information Services Industry



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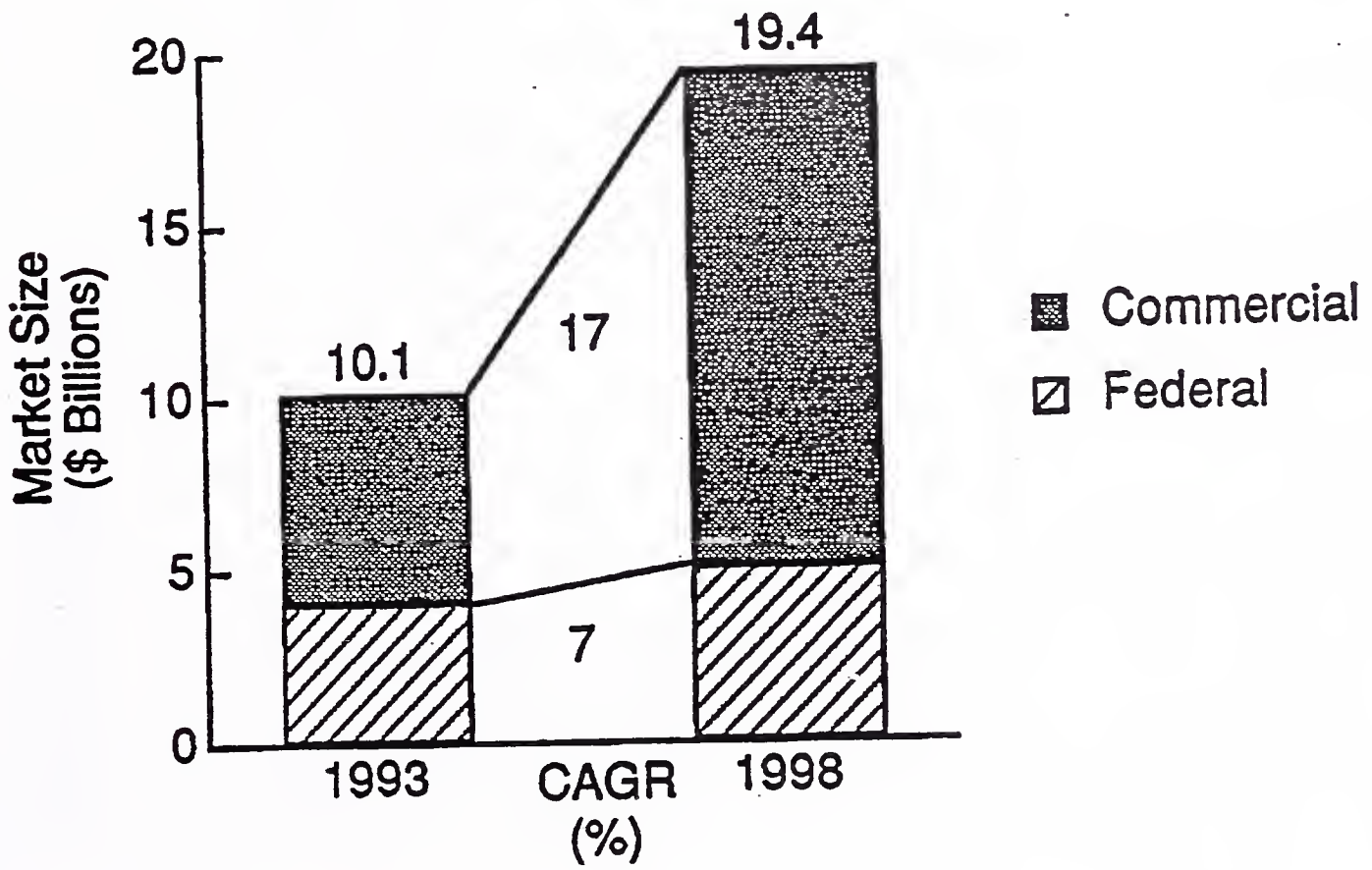
Systems Integration Market Forecast, 1993-1998



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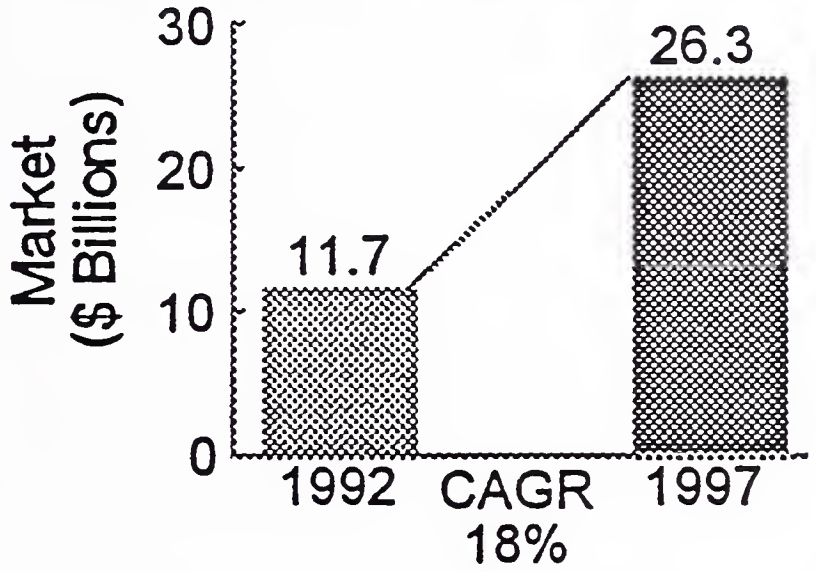
Service Categories

Delivery Category	Addresses	Vendor Role
Outsourcing	Broad Functions • Data Center • Network • Applications • Business Functions	Vendor is responsible for ongoing process

U.S. Outsourcing Market Forecast, 1992-1997



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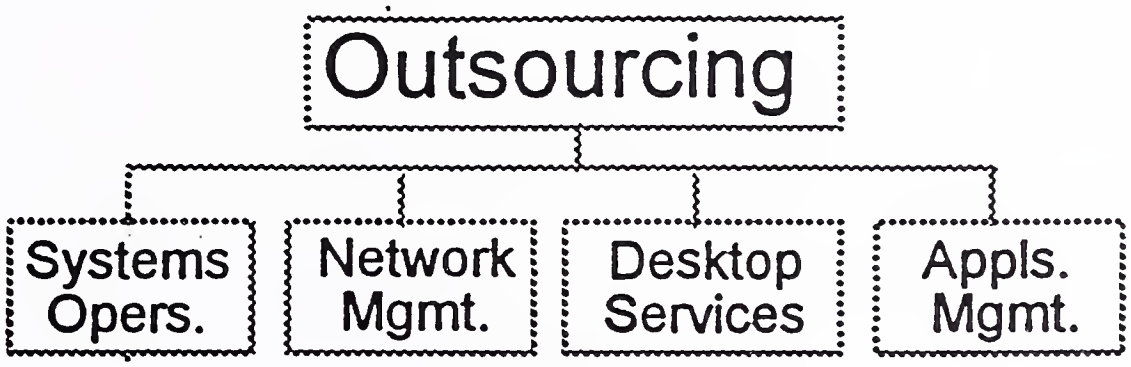

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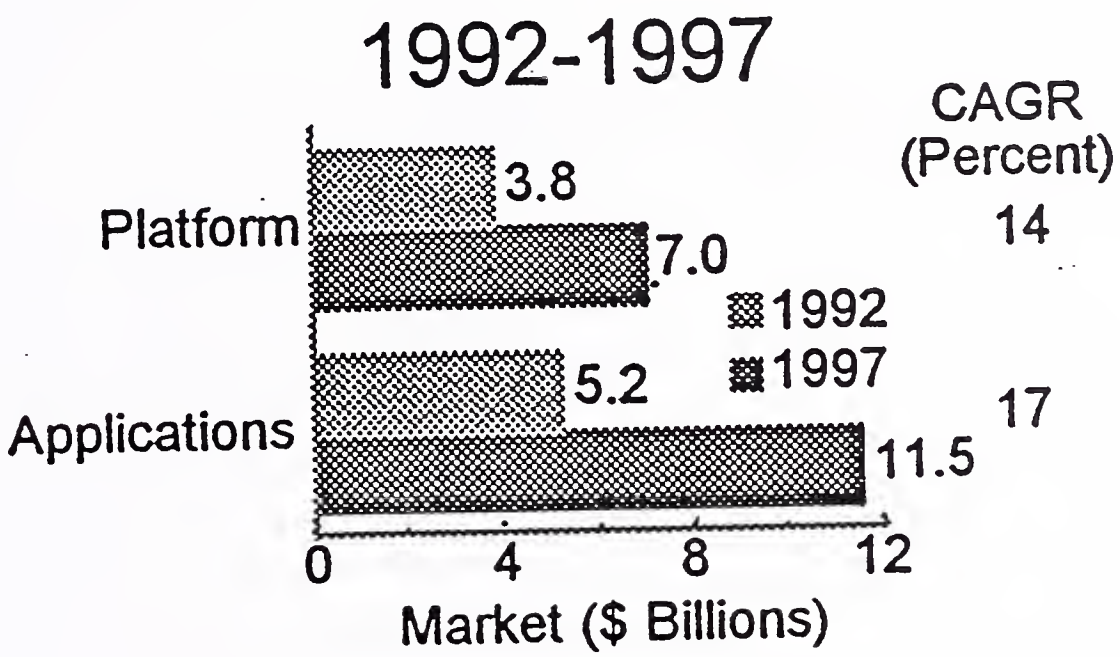
SYSTEMS OPERATIONS MARKET



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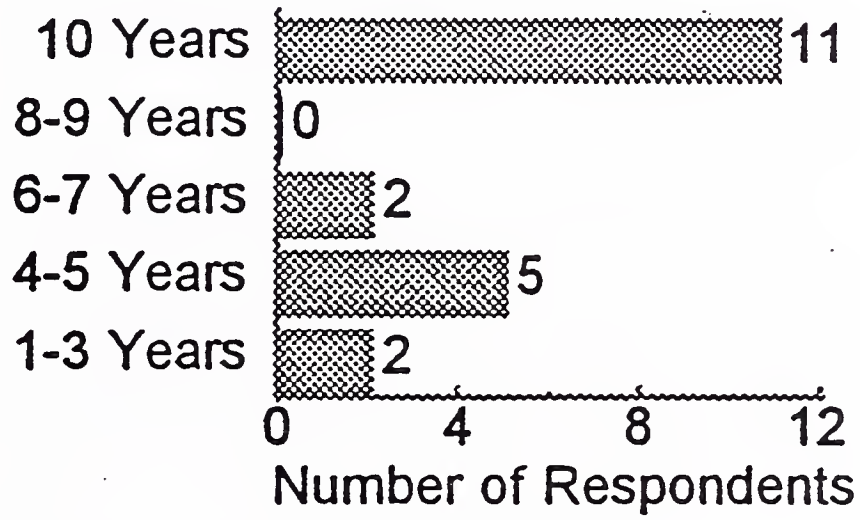
SYSTEM OPERATIONS CONTRACT LENGTH



Average contract length: 7.7 years

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Network Management Components

- Network design
- Configuration management
- Problem management
- Capacity management
- Network administration

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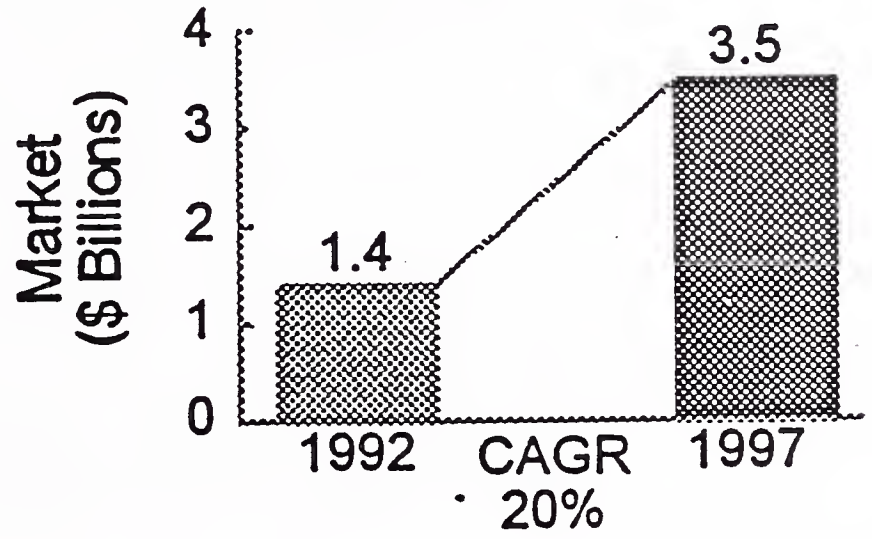
Network Management Outsourcing Forecast



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Elements of Desktop Services

- PC/workstation and software procurement/installation
- PC/workstation maintenance
- Client/server management
- LAN installation and expansion
- LAN management
- Network interface management
- Logistics management
- User support
- Help desk functions
- User training and education

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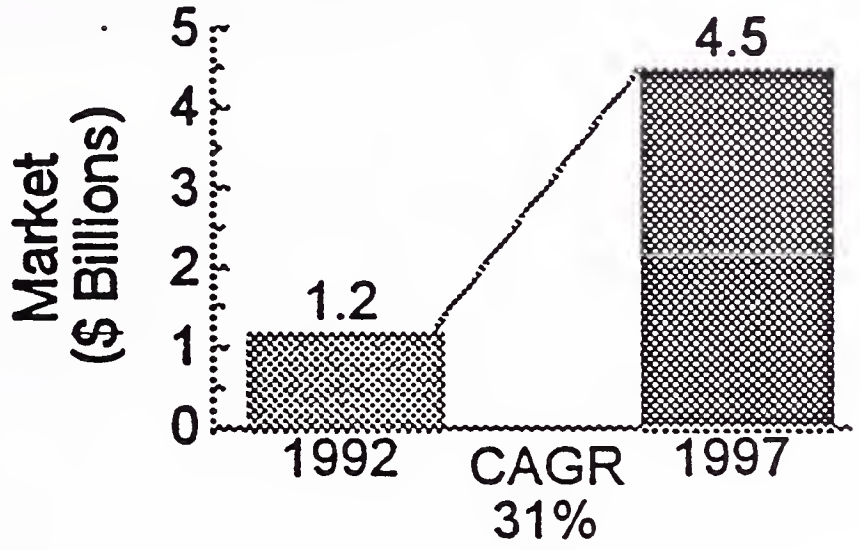
U.S. Desktop Services Market



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Applications Management

Contracted management of development and maintenance of a set of applications for long term (over one year)

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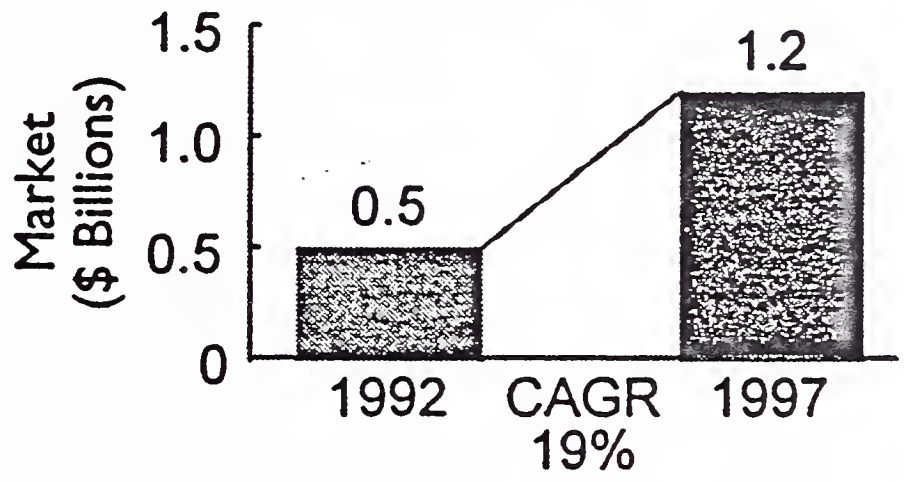
U.S. Application Management Market, 1992-1997



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Service Categories

Delivery Category	Addresses	Vendor Role
Outsourcing	Broad Functions • Data Center • Network • Applications • Business Functions	Vendor is responsible for ongoing process
Processing Services	Narrow Functions	Example: Payroll processing

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OUTSOURCING TRENDS

- Systems operations (data center and applications): A "sunset" market

- Network management and desktop services:

  - High growth

  - Profitability = ????

OUTSOURCING: NEW OPPORTUNITIES

- Outsourcing of business functions, for example, mortgage servicing

  - Computer operations

  - Applications software modifications

  PLUS

  - Assist financial customers in developing new loan products

  - Maintain other back office systems

  - Originate and close loans

  - Answer loan customer questions

(Cont.)

OUTSOURCING: NEW OPPORTUNITES

- Outsource business unit, for example,
- Andersen taking over accounting departments
- EDS becoming a health insurer (i.e., at risk)

CUSTOMER DEPENDENCE AND VENDOR CONTROL

- During the "mainframe era" hardware vendors had close, long-term relationships with their customers.
  - MIS was customer
  - Relationship was primarily technical
  - IBM, especially, had high influence (almost "control") with customers

(Cont.)

CUSTOMER DEPENDENCE AND VENDOR CONTROL

- Mainframe era is over

  - Hardware vendors (including IBM) have decreasing influence over "customers".

  - Customers now buy

    -- Commodity-like PCs

    -- Business solutions

- MIS is no longer the customer

RELATION OF SI AND OUTSOURCING

- Theoretical relationship and attractiveness is high
  - SI is "first step": Analogy to "build/operate" in civil engineering
  - Outsourcing is long term relationship, "annuity"
- Direction can be either "downstream" (first SI, then outsourcing) or "upstream" (first outsourcing, then SI)
- Different models, degree of success
- Experience of actual vendors is instructive

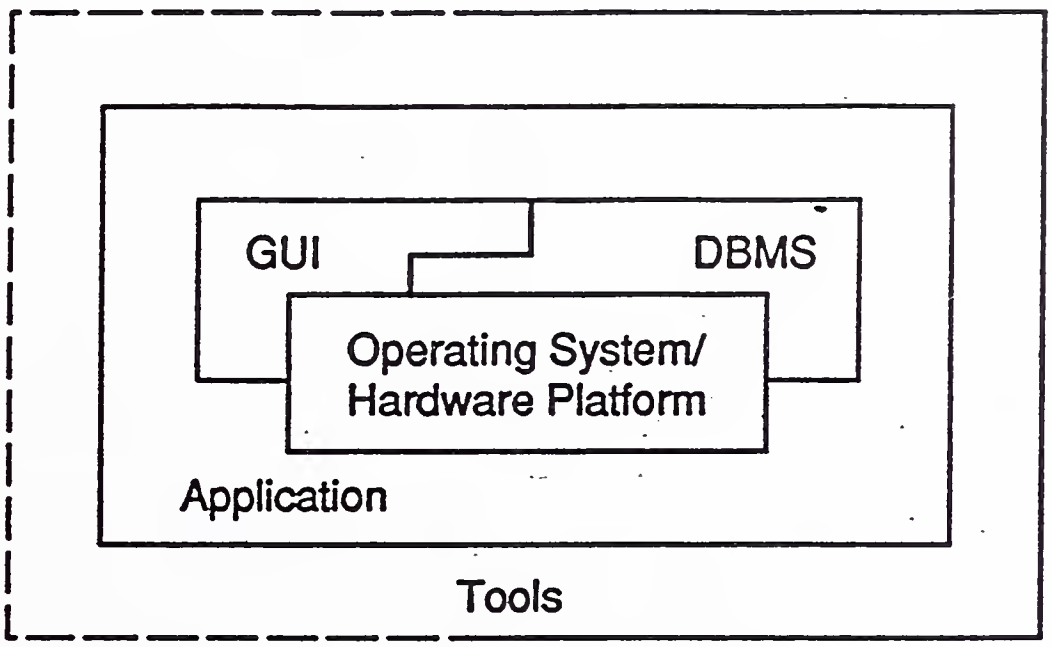
Client/Server Definitions

- **Technical, Operating System Definition:**
  - **Portable**
  - **Multi-Processing**
  - **Scalable**
  - **Networked**

- **Operational "Real World" Definition:**

  A Local Area Network (LAN) where processing and/or data is shared by one or more applications

Client/Server Software Components



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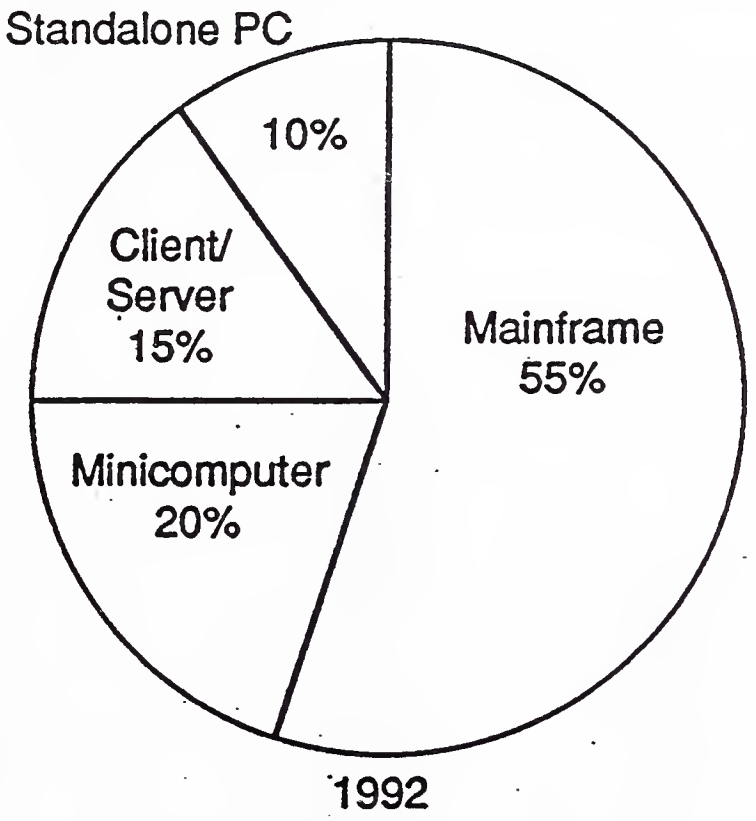
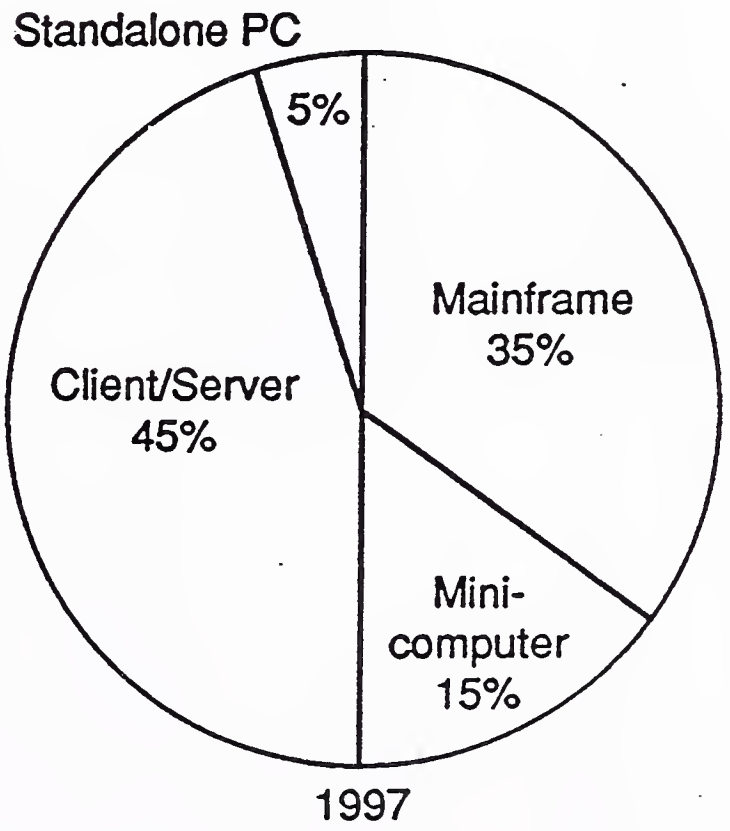
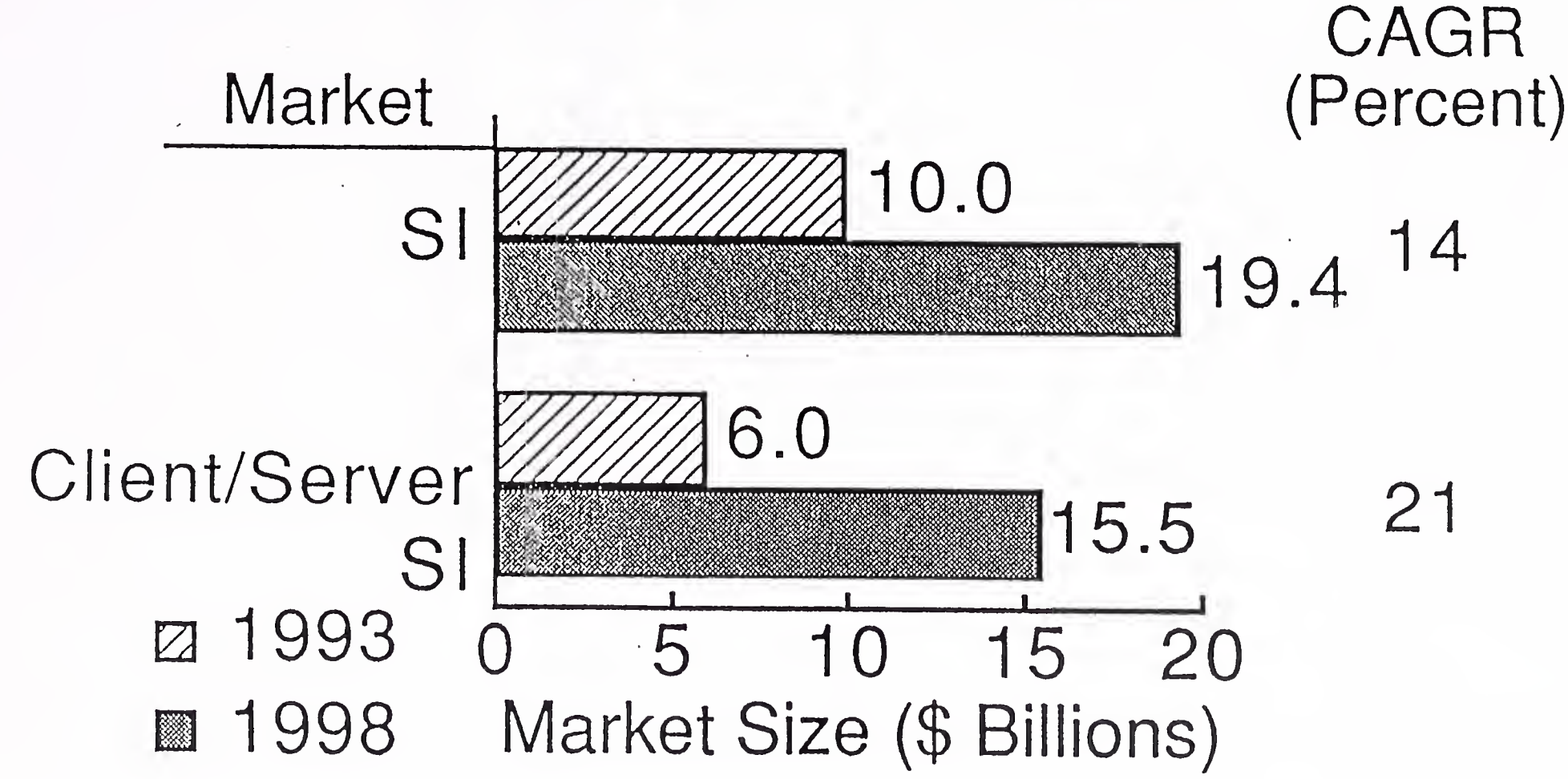
Target Platform for New Mission-Critical Applications: 1992-1997





Source: INPUT Estimates

Market Growth



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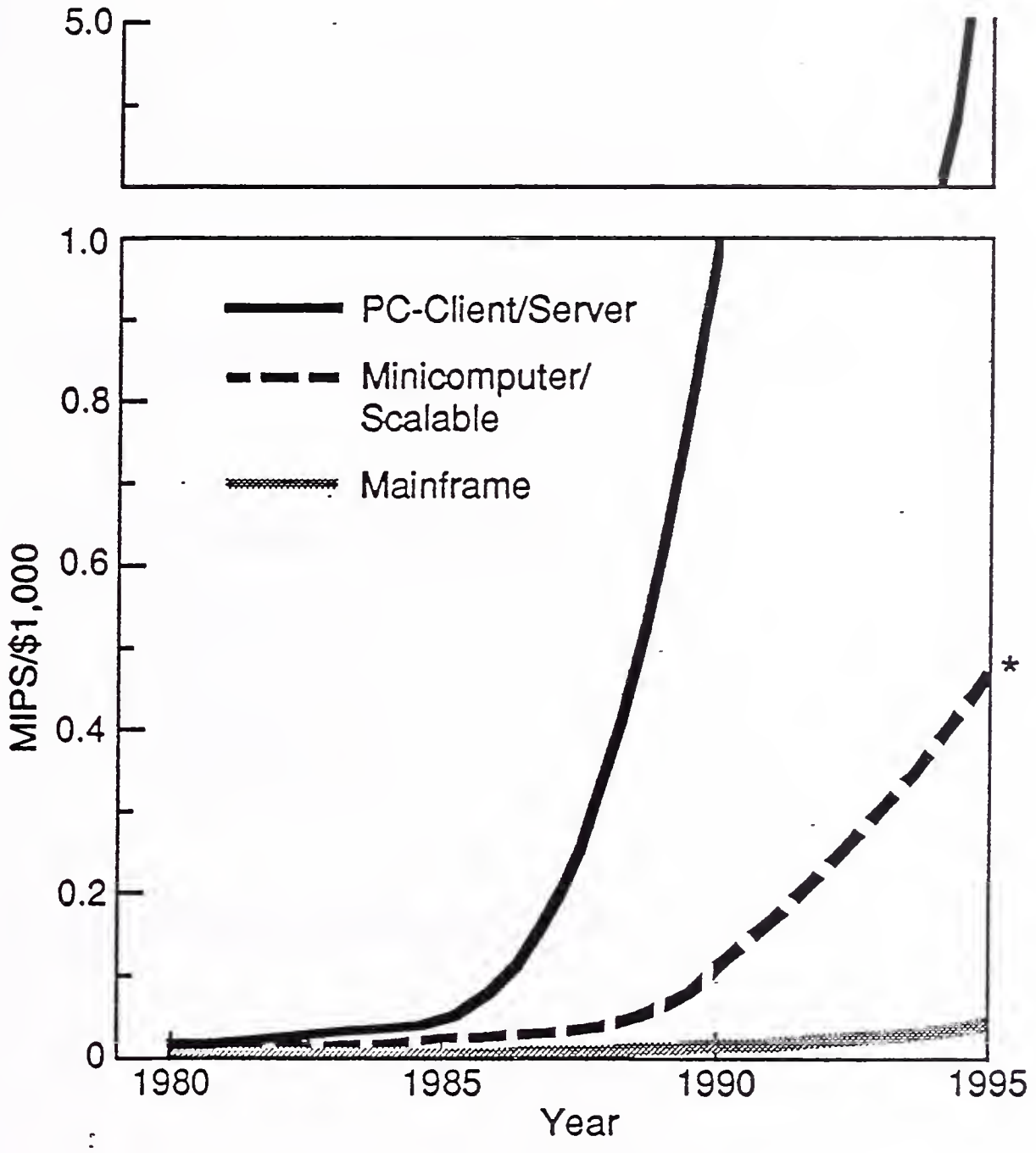
MIPS/$1,000



*Includes scalable processors, e.g.:, NCR 3000 series.

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Driving Forces: Client/Server

- Organizational decentralization
- Business process re-engineering (BPR)
- Technology changes
  - Hardware
  - Software
- Apparent cost savings

What Client/Server Environments Should Developers Prepare for?

8 C/S operating environments

X

8 C/S DBMS

X

9 GUIs

=

576 traps for software developers

+

Which C/S development tools?

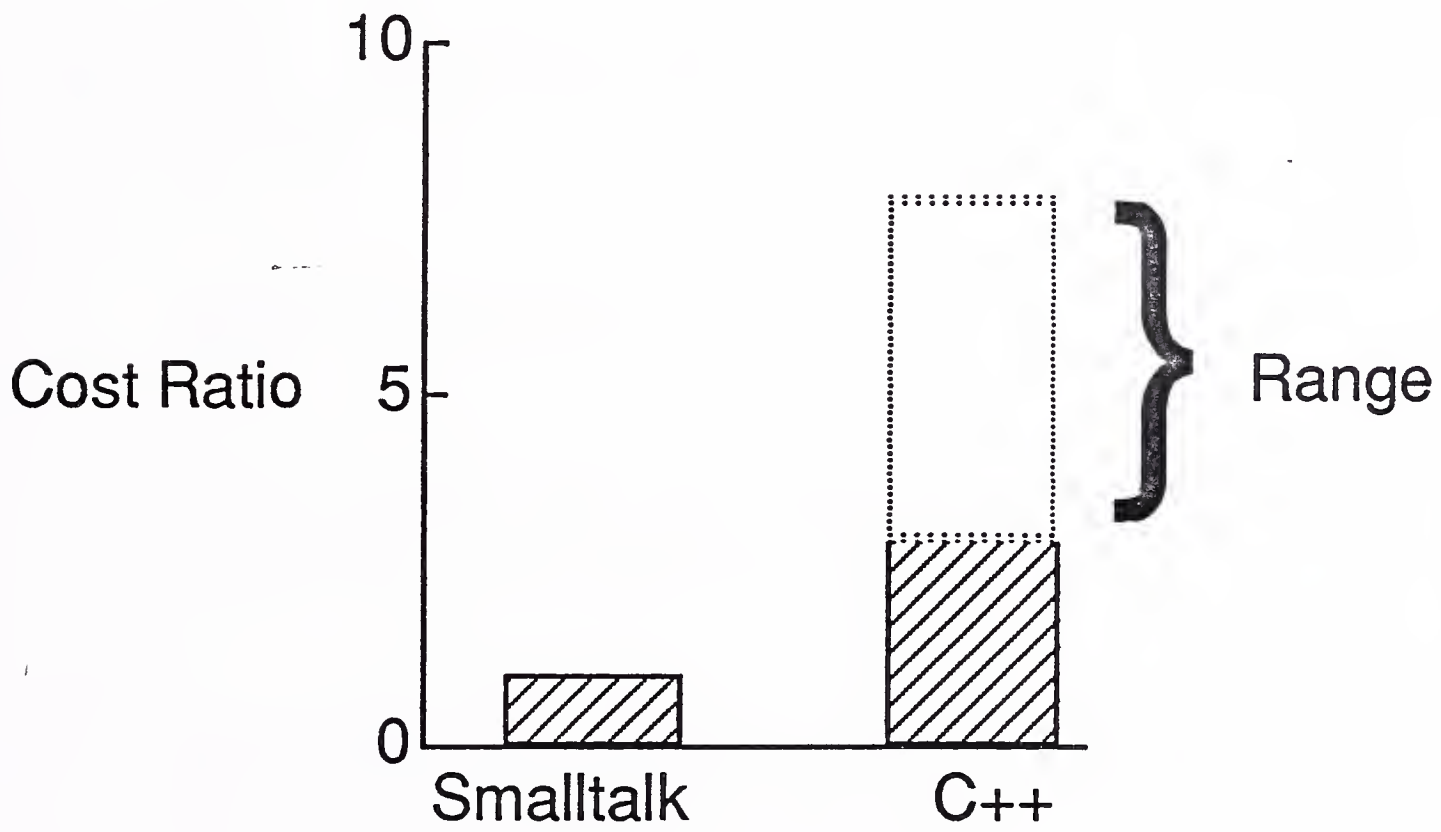
Selected Client/Server Operating Environments

Platform	Vendor
Macintosh	Apple
OS/2	IBM
NT	Microsoft
Windows	Microsoft
Object Management Architecture (OMA)	Object Management Group
"Pink"	Taligent (IBM/Apple)
UNIX	Various

Selected Client/Server Data Base Servers

Server	Vendor
Ingres	ASK
Rdb	DEC
SQL Server	Gupta
All base	HP
DB2	IBM
Informix	Informix
Oracle	Oracle
Sybase	Sybase

Relative Costs; C++ and Smalltalk (Provisional Data)



But, C++ has 10x more market share and "mind share"
(based on data base searches)

CLIENT/SERVER WINNERS AND LOSERS

- Losers are more easily identified than winners

- "Losers" are organizations and products closed linked to "host-oriented" computing (mainframes and minis)

  - IBM as a whole

  - MVS-based software products (systems software and applications software)

  - Established vendors offering CASE (Computer-Assisted Software Engineering) tools

  - Less flexible and/or mainframe-oriented professional services vendors (for example, many parts of IBM and DEC)

LIKELY CLIENT/SERVER WINNERS

- Microsoft (NT, networking, possibly application development tools)
- Novell (Networking, UNIX)
- Oracle, Sybase + ?????? (Data base management system suppliers)
- Possibly IBM (OS/2, DB2/2, networking + services)
- Flexible, focused SI vendors (EDS, Andersen + ???)
- Low cost PC/workstation suppliers (Vendors likely to continue to change)
- First successful developers of application development methodologies and tools for client/server development (No solid indication of identity; after 1996).

SI Vendors: Overview

Systems Integration Vendor Examples by Class

Class	Examples
Hardware manufacturers	Digital, Hewlett-Packard, IBM, NCR/AT&T, Unisys
Communications companies	AT&T, Contel, GTE, Regional Bell Operating Companies
Professional services companies	
• Consulting-based	Andersen Consulting, Booz-Allen & Hamilton, Coopers & Lybrand, Deloitte & Touche, Ernst & Young, KPMG Peat Marwick, McKinsey, Price Waterhouse
• IS professional services	American Management Systems (AMS), CAP Gemini, CSC, Computer Task Group (CTG), SAIC, SHL Systemhouse
Systems operations	EDS, Litton, Systems and Computer Technology (SCT), ISM Corporation, Systematics
Aerospace companies	Boeing Computer Services (BCS), Hughes/GM, Litton Computer Services (LCS), Martin Marietta, TRW
Software suppliers	Microsoft, Novell, Oracle, Sterling Software
Other	Bechtel, Covia

Leading Providers of SI/Professional Services 1992 U.S. Revenue

Vendor	$ Million
IBM	2,600
EDS	1,425
CSC	1,225
DEC	1,175
Andersen	1,150
Unisys	1,150
SAIC	550
PRC	525
Martin Marietta	500
Cap Gemini	420
NYNEC/AGS	350

Leading Providers of SI/Professional Services 1992 U.S. Revenue (Cont.)

Vendor	$ Million
Grumman	325
Coopers & Lybrand	275
Logicon	275
ATT	275
Price Waterhouse	250
Deloitte & Touche	250
Ernst & Young	250
AMS	250
HP	250
Computer Task Group (CTG)	225
KPMG	175

LEADING SYSTEMS OPERATIONS VENDORS - 1992
($ Millions)

EDS (non-GM)	$1,600
CSC	625
IBM	500
American Express	450
Affiliated Computer Services	225
Systematics	200
Shared Medical Systems	175
Martin Marietta	175
DEC	150
SEI	150
Andersen Consulting	125

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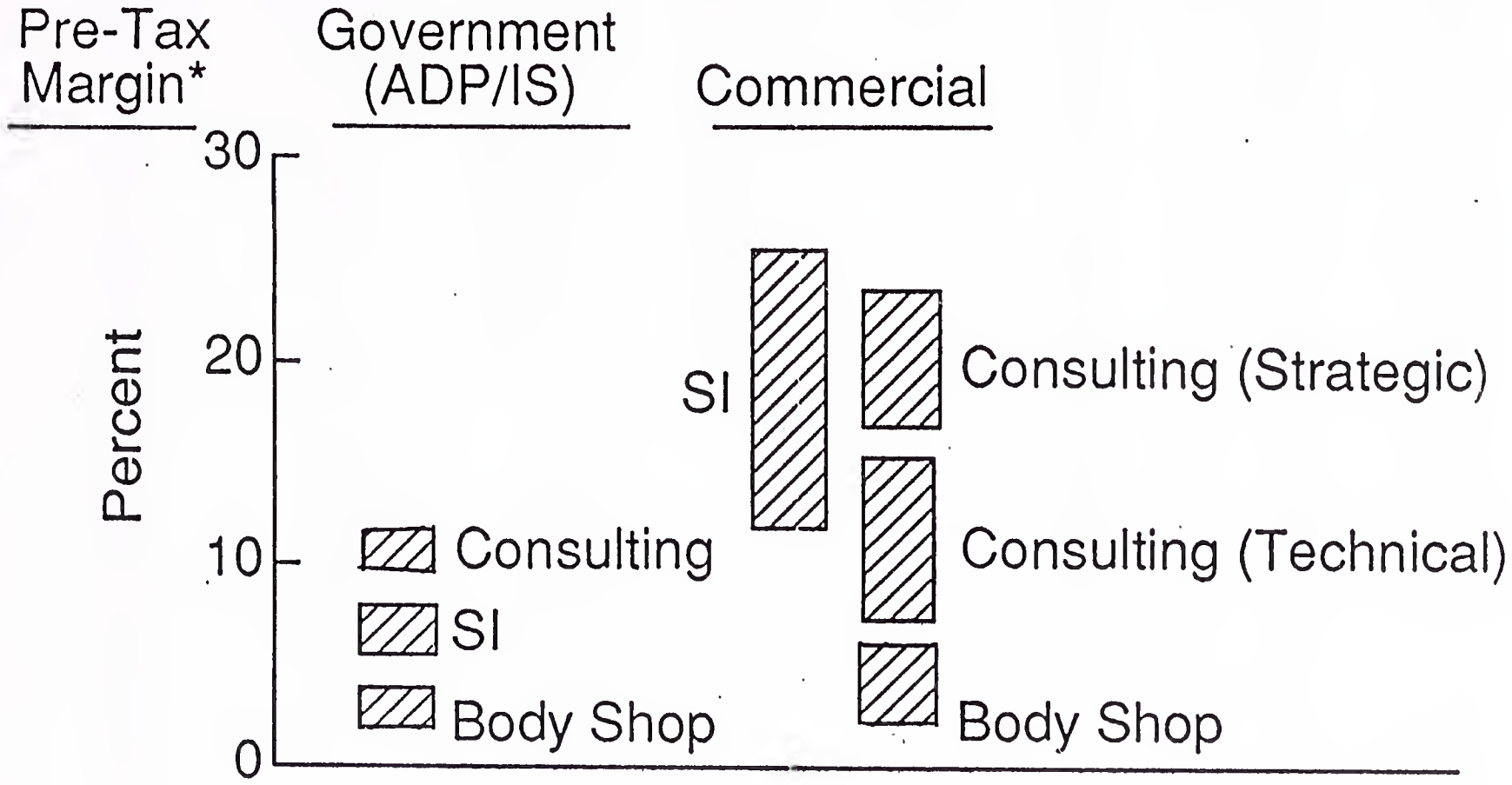
Typical Professional Services/SI Margins



* Includes partnership distribution

Source: INPUT estimates

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VENDOR CAPABILITIES

Systems Integration

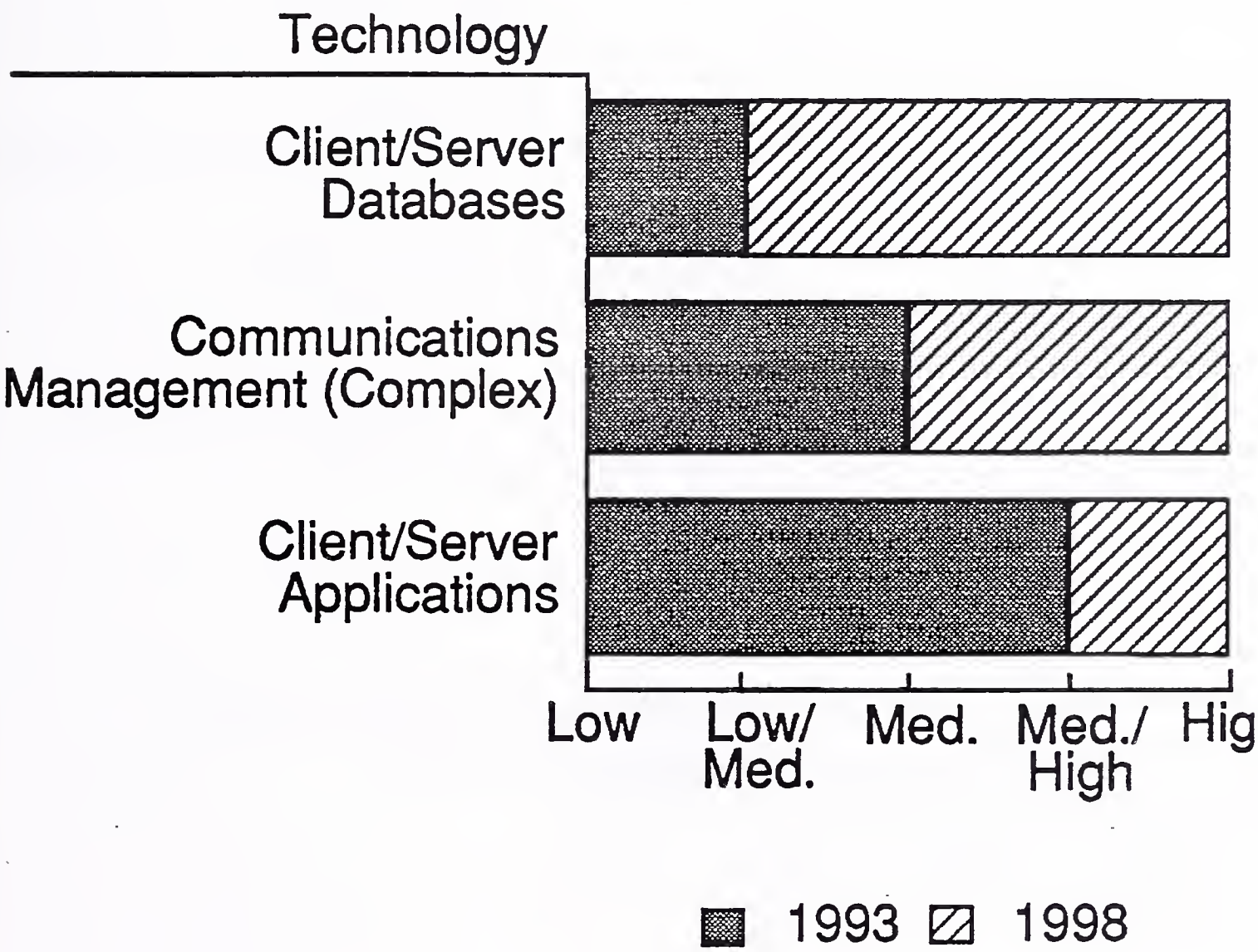
- Industry business knowledge
- Applications knowledge (strong linkage to business knowledge)
- Broadbased technical knowledge

Outsourcing

- Efficient data center operations (traditional platform operations)
- Client/server operations skills for desktop services outsourcing
- Financial strength and willingness to take financial risks
- Business and applications knowledge (future)

SI-Related Technologies: High Importance in 1998

Compared to Importance in 1993



Source: INPUT Assessment

SI2- 1

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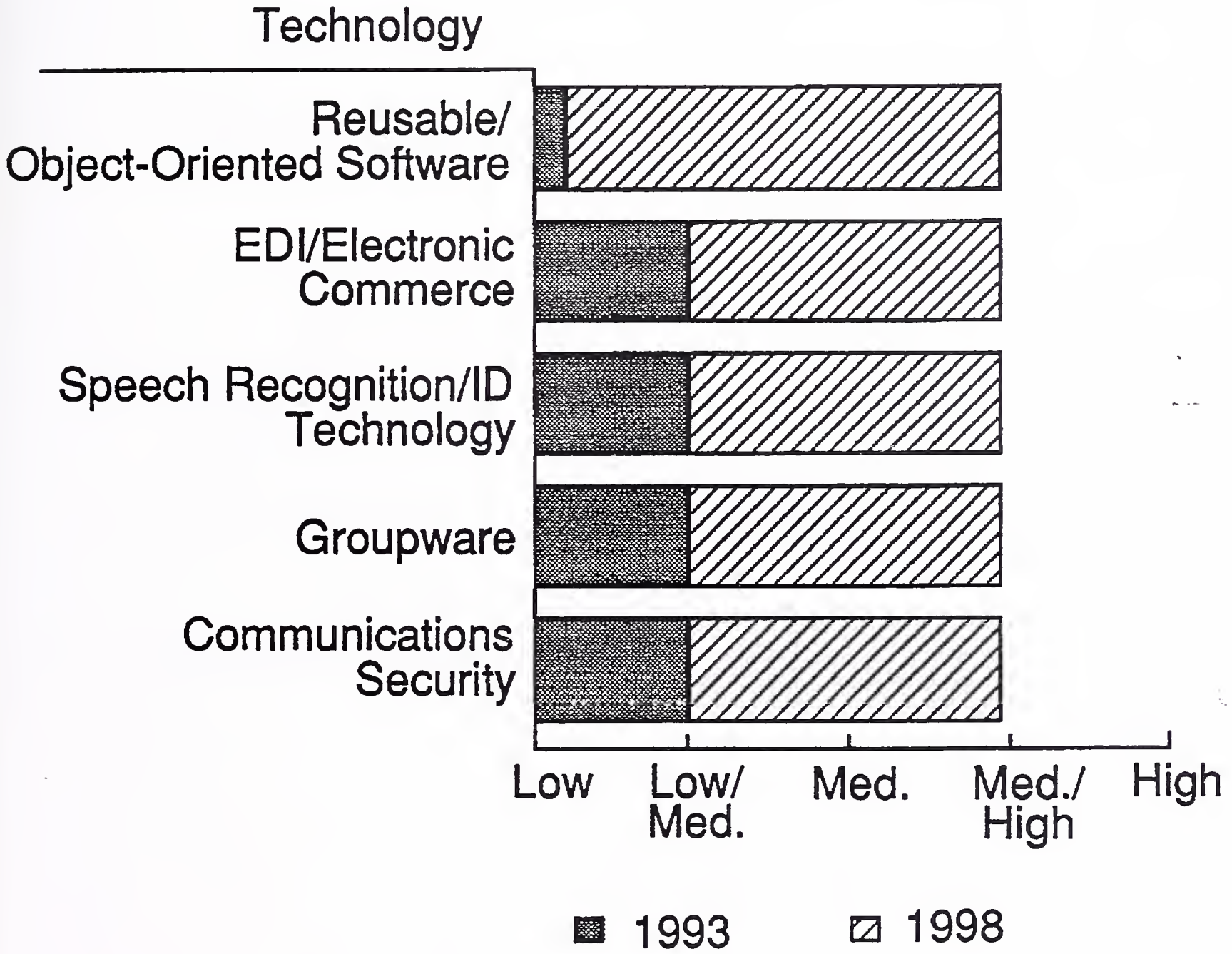
SI-Related Technologies: Medium/High Importance in 1998

Compared to Importance in 1993



Source: INPUT Assessment

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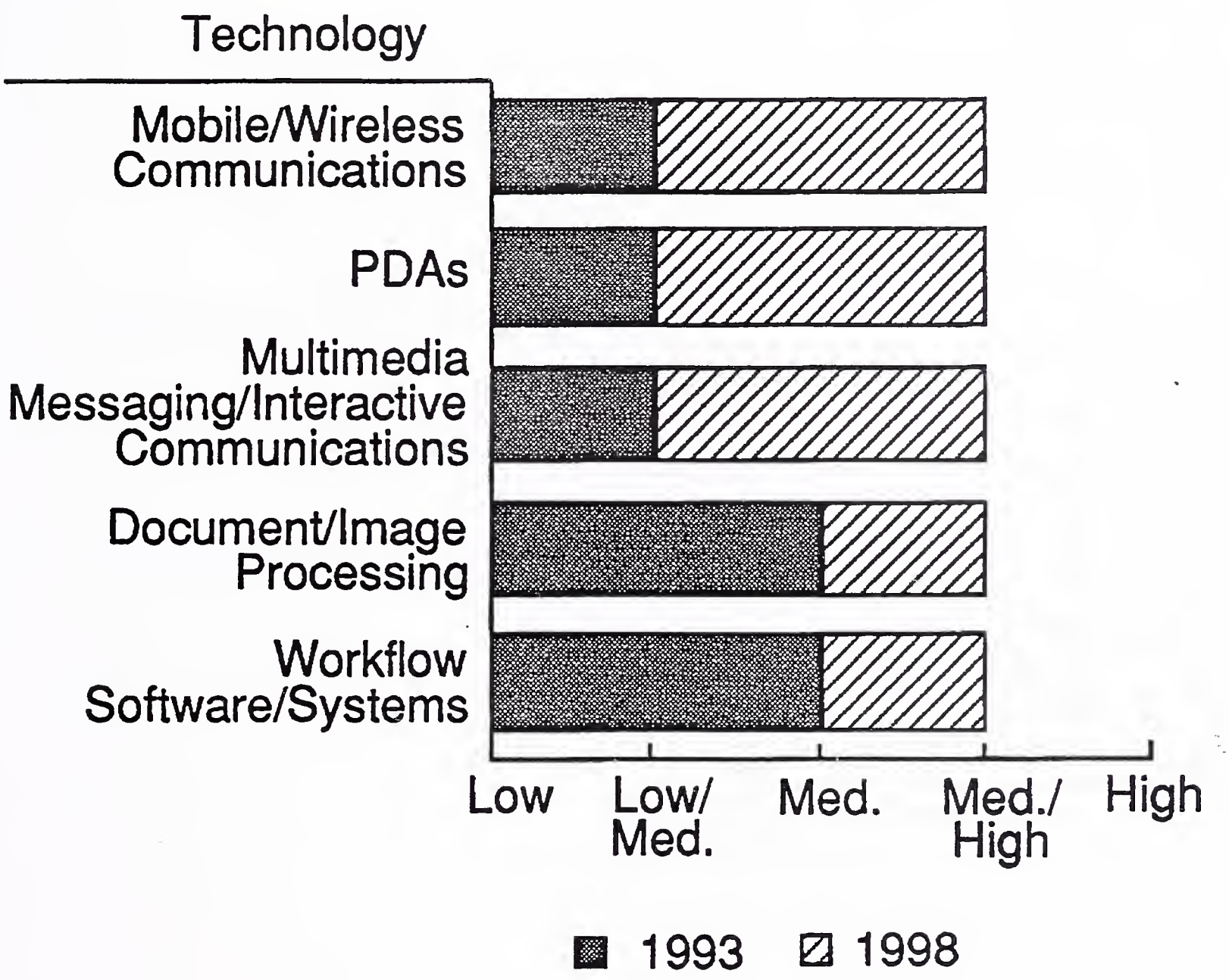
SI-Related Technologies: Medium/High Importance in 1998

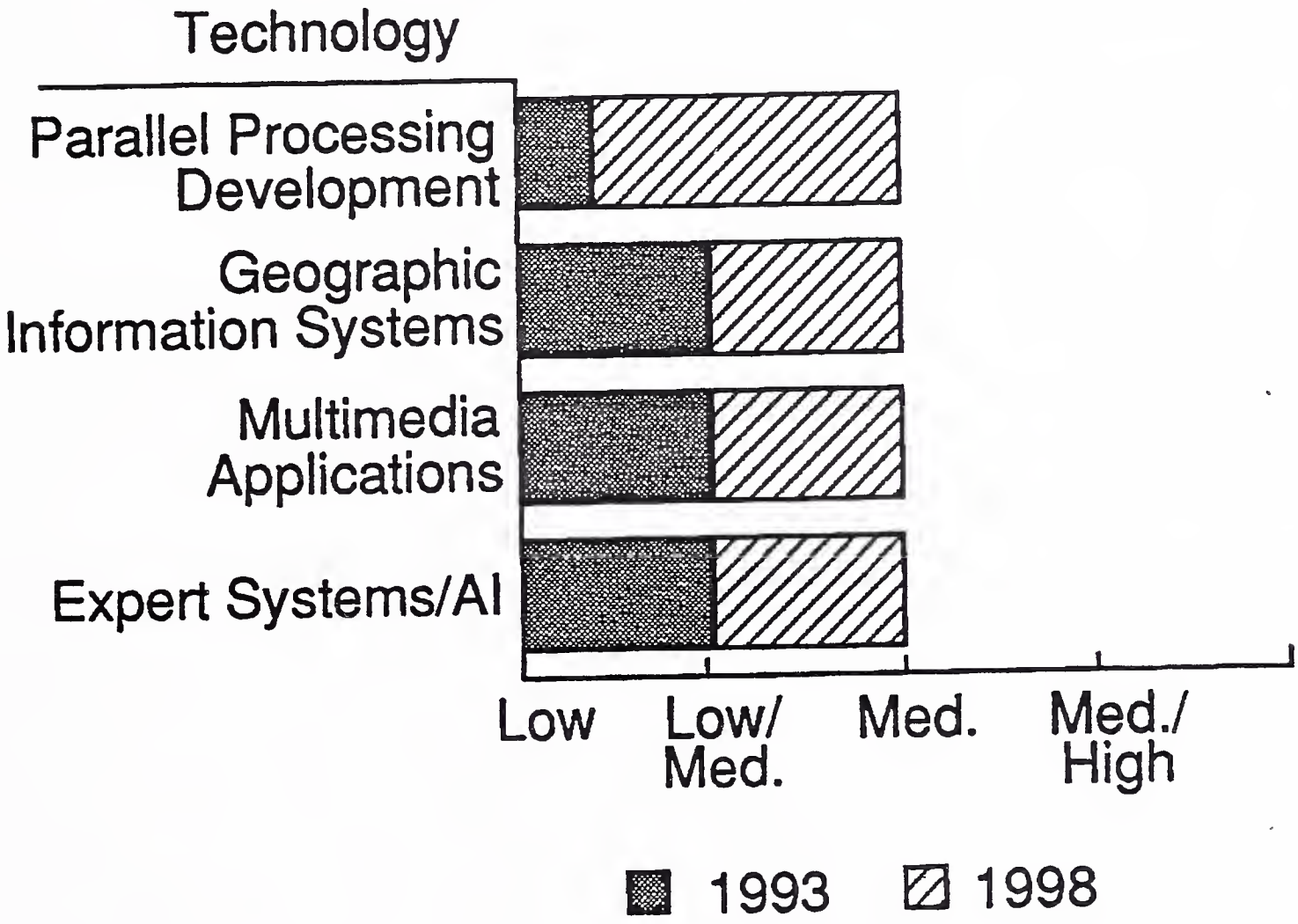
Compared to Importance in 1993



Source: INPUT Assessment

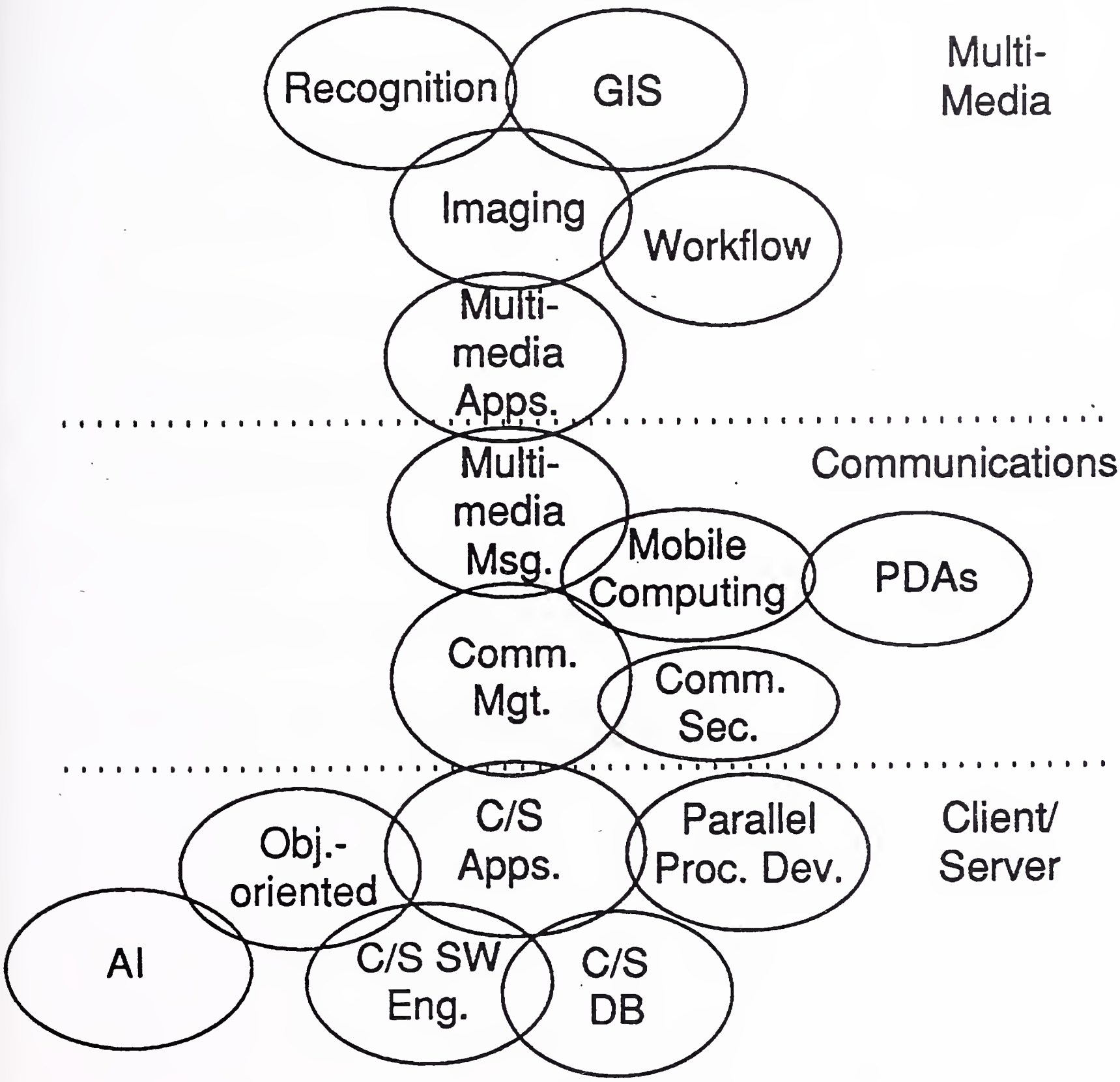
SI-Related Technologies: Medium Importance in 1998

Compared to Importance in 1993



Source: INPUT Assessment

Linkages Between SI Related Technologies



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VENDOR PROFILES: COMMONALITIES

Strategy

- Above average growth (compared to industry averages)
- Industry focused -- all major industry groups
- World-wide focus
- Client/server focus

Organization

- Changing organizational structures

Functional and Technical Skills

- "Re-skilling" staff

(Cont.)

VENDOR PROFILES
COMMONALITIES

Education and Training

- **Historically, almost all employees were hired directly from college.**

- **Active formal education programs, especially in targeted areas of technology**

EDS PROFILE

Strategy

- To be supply full range of IT-related services
  - Systems operations outsourcing (original business)
  - SI
  - All industry sectors
- Half of business is (captive) GM business: objective is for this to continue to shrink
- Objective is to build business outside of U.S. by
  - Building on GM relationships
  - Targeted acquisitions (no acquisitions in U.S.)
- Profitable business is very important to EDS, although EDS is willing to make investments that will have a longer term payoff.

(Cont.)

Organization (EDS)

- Major change to industry-focused business units in 1989
  - Over 25 units with profit and loss responsibility
  - Industry units draw on common technical support units (networks, PC supply, computer operations, etc.)

- At the same time, the organizational culture was being changed to be less "military", as it was under Ross Perot.

- Sales and marketing group in each industry business unit identifies business opportunities.

(Cont.)

Organization (EDS)

- Account manager takes over to define work and establish ongoing relationship
  - Technical background (e.g., for systems operations)
  - Industry/applications background (for SI)

- Industry/applications background (for SI)

(Cont.)

Functional and Technical Skills (EDS)

- Much more emphasis on technical knowledge than 10 years ago. (Partly a result of GM acquisition)
- Active centralized training for technical skills.
- Much of technical skills are embedded in support units.
- EDS is a leader in software engineering
- Industry and applications skills are mainly obtained on the job

(Cont)

Education and Training (EDS)

- New employees take part in a rigorous initial training program, followed by assignment to projects. Employees work very hard.

- About one-third of new employees leave during the first three years of employment. Much lower rates of turnover thereafter.

- Employees must repay EDS for part of training cost if employee leaves EDS voluntarily within first three years.

SI AND OUTSOURCING: EDS

- 1985: 95% outsourcing
- Strategic decision to go upstream
- Built SI business internally in U.S.
- SI and outsourcing loosely coupled
- Strategy has been executed well and has worked

ANDERSEN CONSULTING PROFILE

Strategy

- To build on SI and industry strengths.
- To enter new markets cautiously.
- Because of Andersen's partnership structure, short term profits are very important.
- Andersen will make high profile investments (e.g., advanced technology centers, training centers).

Organization

- Partnership organizational structure is both a strength and a weakness.
  - Partners are entrepreneur
  - Managing a partnership is difficult, especially during a period of technological change

(Cont.)

<u>Organization</u> (Andersen)

- Andersen has maximized effectiveness of the partnership model
  - Central management and technical support
  - A definite "Andersen Culture": Client-oriented, very hard working, very flexible, teamwork.
- In the late 1980s there were severe strains between Arthur Andersen (accountants) and Andersen Consulting. Andersen Consulting became semi-independent five years ago.
- Partners are responsible for both selling and executing work.
  - A very effective arrangement during periods of high growth: From hiring to partner in 7 years.
  - This is a more effective model for SI work than for outsourcing work

(Cont.)

Functional and Technical Skills (Andersen)

- Historically, Andersen staff has not been leading edge.
- So far, this has not hurt Andersen -- clients value Andersen's application knowledge more.
- There are groups within Andersen that want to increase Andersen's technical expertise, but it is not clear if changes will be made.

(Cont.)

Education and Training (Andersen)

- After two-three months of training new employees are assigned to projects: On the job training is very important, especially for the less tangible skills (sales, client management)

- Andersen, like EDS, has high initial turnover, followed by a leveling off.

  - In the past, there was another batch of departures at the 7 to 9 year period for those that did not make partner.

  - Andersen has attempted to remedy this by establishing "Associate Partners".

(Cont.)

ANDERSEN CONSULTING PROFILES

- Formal training is ongoing.
  - There is a large central training site near Chicago.
  - Andersen spends about $8,000 per year per professional employee on training.

SI AND OUTSOURCING:
Andersen Consulting

- Traditional leader in SI

- Position up to 1990: SI and outsourcing in conflict

  - May not be objective in SI stage

  - Unlikely that firm can be equally strong in applications knowledge, project management and systems operations.

  - Large investment needed for outsourcing.

- Position 1990-92: Tried to supply mainframe systems operation services

- Strategy <u>not</u> successful:

  - Not competitive in "mega contracts" (resources, credibility)

  - Not fully supported within Andersen

(Cont.)

SI AND OUTSOURCING: Andersen Consulting

- **INPUT conclusion: A matrix-managed vendor may not be well-positioned to supply large-scale systems operations services**

- **Andersen now cautiously attempting business operations outsourcing**

IBM PROFILE

Strategy

- **Top management in IBM have repeatedly stated that IBM's future is in software and services.**

- **At present, there is not a single strategy to achieve the objective. Between 1989 and 1993, four quite different service delivery organizations were created.**

- **INPUT believes that the new management of IBM will keep the strategy, but will rationalize its execution.**

- **Up to now, IBM has stressed revenue growth in services as opposed to profitability. Effects include:**

  - **"Buying" business, often low value-added professional services business.**

  - **Supplying mainframe-based services, as opposed to client/server services.**

(Cont.)

Organization (IBM)

- The following organizations deliver IT services to U.S. customers:

  - IBM's 64 Trading Areas, each of which has "Services Branch" for providing professional services and SI. (Note: The Trading Areas were created to promote hardware sales.)

  - ISSC, originally established to provide systems operations services -- it now provides a broad range of SI and other services.

  - The IBM Federal Systems Division (now in the process of being sold)

  - The IBM Consulting Group, providing management consulting and business process re-engineering

(Cont.)

Organization (IBM)

- There have been no established mechanisms for coordination. This overlapping is consistent with IBM's tradition of internal competing groups. However, this organization

  - Is costly and inefficient

  - Often prevents development of a critical mass of industry or technical knowledge

  - Is difficult to mobilize for large and/or geographic diverse projects.

  - Is confusing to customers and prospects.

(Cont.)

Functional and Technical Skills (IBM)

- IBM is slowly rebuilding its industry and application skills.

- Most of IBM's technical skills are mainframe oriented; IBM has been slower than its main competitors in "re-skilling"

  - Its organization structure makes it difficult to plan or execute.

  - The cutbacks, downsizing and management changes have added to uncertainties.

- In part, because of these deficits in skills IBM has relied extensively on subcontractors for SI work.

(Cont.)

Education and Training (IBM)

- Historically, IBM has placed great emphasis on employee training. Today it is one of the largest providers of third party education.

- Unlike EDS and Andersen, IBM does not have a pattern of following up initial formal training with on the job experience.

  - In part this is due to the culture that sees services and associated skills as supporting hardware sales.

SI AND OUTSOURCING: IBM (ISSC)

- 1989: 100% outsourcing
- 1993: 100% outsourcing + "SI" [related services]
- Not a planned strategy
- The mix of business has been critical to success

STRATEGIES FOR HARDWARE VENDOR ENTRY INTO SI

- Subcontractor
- Niche SI Vendor
- Acquisition
- Strategic Partnership

Subcontractor

- Technical staff
  - Technology specialists (e.g., client/server, communications, DBMS)
  - Implementation staff (large project support)
- Components (hardware, software)
  - Commodity (e.g., RISC computers)
  - Value-added (e.g., imaging engine)
- Subsystems
  - Example: Imaging subsystem for check processing
  - Some components may come from other sources

Example: Imaging SI

- BPR
- Understanding process alternatives
- Cameras
- Imaging engine
- Image interpretation software
- Database
- Image/data retrieval
- Interfaces to other systems
  - Logical
  - Physical

Niche SI Vendor

- Variety of experience in a business segment
  - Industry (e.g., chemicals, banking)
  - Applications
    - Cross-industry (e.g., customer information systems)
    - "Vertical" industry (e.g., oil refinery management systems)
- Available expertise
  - Project management
  - Technology evaluation
  - Business processes
  - System design
  - System implementation

ACQUISITION

- Size of acquisition: large vs. small
  - Impact on parent
  - Impact on market
  - Risks and rewards
- Special factors
  - Hardware company as parent
  - Foreign owner
    - Business culture differences
    - Defense contracts

STRATEGIC PARTNERSHIP

- Long term flexible relationship (probably not a joint venture)
- May involve minority investment (but need not)
- Mutual advantage; mutually defined objectives; complementary skills.
- Example: Industry-oriented consultant that does not have resources or project management skills for complex SI. [For SI firm strong in large projects.]
- Example: SI firm that is not in outsourcing business.
- Example: SI firms with different technological skills.

STRATEGIC PARTNERSHIP: POTENTIAL RISKS AND PROBLEMS

- Dependence on third party
  - More exposure than product dependencies
  - Many different situations
  - Constant change: Technology; client needs
- One side may "outgrow" the other
- Changing market and technical environments: A good partner in 1994 may no longer be a good partner in 1997
- Changing needs of either or both of the partners

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- **Software and Services Vendors**
- **U.S. Federal Government**
  - Procurement Plans (PAR)
  - Forecasts
  - Awards (FAIT)
- **Commercial Application (LEADS)**

CUSTOM PROJECTS

For Vendors—analyze:

- **Market strategies and tactics**
- **Product/service opportunities**
- **Customer satisfaction levels**
- **Competitive positioning**
- **Acquisition targets**

For Buyers—evaluate:

- **Specific vendor capabilities**
- **Outsourcing options**
- **Systems plans**
- **Peer position**

OTHER SERVICES

Acquisition/partnership searches

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